REMARKS

Claims 1-34 were pending in the above-captioned application. Claims 13-23 have been withdrawn from consideration as the result of a restriction requirement (the election of claims 1-12 and 24-34 for prosecution on the merits being hereby affirmed), claims 1, 12, 24 and 34 amended and claims 10, 11, 32 and 33 canceled herein, in order to more clearly define and fully protect Applicants' invention. Allowance of all claims 1-9, 12, 24-31 and 34 is believed appropriate and is respectfully requested.

The amendments made herein to claims 1 and 24 consist of specifying that the claimed heat spreader material comprises at least one sheet of compressed particles of exfoliated graphite, with the result that claims 10, 11, 32 and 33 have been canceled as being redundant. In addition, claims 12 and 34 have been amended to correct their dependency as a result of the cancellation of claims 11 and 33.

Rejections Under 35 U.S.C. §103

All pending claims stand rejected under 35 U.S.C. §103 over Morita et al. (U.S. 5,831,374) in view of Tzeng et al. (U.S. 6,245,400), with respect to claims 1-9 and 24-31, and Morita et al. in view of Tzeng et al. and further in view of Brookes (U.S. 3,981,427), with respect to claims 12 and 34.

As a first point, the Morita et al. disclosure relates to a thermal interface material (TIM), used to provide a heat pathway between the plasma display panel and a heat sink. This is necessary in Morita et al., since the patent revolves around the fact that heat sinks cannot conform to a curved plasma display panel. The TIM of Morita et al. is needed to "fill the gap" created between the heat sinking units and the curved panel.

Moreover, Morita et al. relates to the use of synthetic graphite for the disclosed TIM, and contains no disclosure or suggestion of the use of sheets of compressed particles of exfoliated graphite as a heat spreader. More specifically, Morita et al. relates to the use of "a high-orientation graphite layer interposed between said panel unit and said heat sinking unit." Although the patent does use the term "high-orientation flexible graphite film," it is clear that this simply refers to a physical characteristic of the film (flexibility as opposed to rigidity) rather than the term of art used to describe sheets of compressed particles of expanded graphite (see, col. 13, lines 39-44 of the Morita et al. patent). Indeed, a review of the Morita et al. disclosure leads to the inescapable conclusion that pyrolytic graphite is the material employed as the Morita et al. "high-orientation graphite layer."

More particularly, the term "graphite" encompasses crystalline carbonaceous materials which can be synthetic in origin, including:

- graphites formed by combining coke and pitch, baking the mixture to vaporize volatile components of the pitch, and then graphitizing the mixture at temperatures of about 3000°C;
- graphites formed by vapor phase deposition of hydrocarbons followed by annealing of the resulting structure; and
- graphites formed by graphitizing a polymer compound at temperatures in excess of 2000°C in an inert gas under pressure,

or graphites which are natural in origin, including the compressed particles of expanded natural graphite from which the heat spreaders of the above-captioned application are formed.

The only definition provided in the specification of the Morita et al. patent for the terms appears at col. 11, lines 49-52, where the patentees state that, "[T]he high-orientation graphite used in the third embodiment should be high-crystalline graphite with graphite crystals oriented substantially in one direction, especially graphite whose rocking characteristic is 20 deg. or lower." However, that language can be applied to each of the unrelated forms of graphite described above. In addition, the cited patent makes a distinction between high-orientation graphite film and "normal graphite sheet" without in any way defining what is meant by "normal graphite sheet" or explaining what the differences are (see col. 14, lines 17-22).

Therefore, by law, we are left to rely on the specific examples of suitable graphites described in the specification.

The only graphites defined or described with specificity in the patent are vapor phase deposition graphites and graphitized polymer graphites (col. 11, lines 53-59), with the graphitized polymer graphites preferred and having a synthetic route and starting materials discussed in detail (col. 11, line 60-col. 13, line 38). These are two of the three common types of synthetic graphite, and the Morita et al. patent must be construed so as to be limited to these two forms of graphite.

In addition, it must be noted that there is a significant difference between utilizing a sheet of compressed particles of expanded natural graphite, as claimed in the above-captioned application, and a vapor phase deposition synthetic graphite or a graphitized polymer synthetic graphite, as disclosed in Morita et al. The synthetic graphite industry is distinct from the natural graphite industry, with no substantial technological cross-over between the two. Indeed, the three forms of synthetic graphite discussed above are considered by those skilled in the respective arts to be wholly discrete forms of graphite and distinct from each other. Moreover, there is no general understanding or assumption in the respective graphite industries, nor in industries that utilize graphite-based products, that the forms of graphite are in any way interchangeable.

Thus, Morita et al. cannot and does not disclose or suggest the use of sheets of compressed particles of exfoliated graphite as a heat spreader for a plasma display panel. While it is true that, in accordance with Tzeng et al. and other prior art of record, the production of sheets of compressed particles of exfoliated graphite is known, the use of such sheets as heat spreaders for plasma display panels has never been disclosed or suggested. Given the substantial technical distinctions between the different forms of graphite, the substitution of one for the other is not suggested and the Office Action has not provided any motivation for the skilled artisan to make such a substitution.

Additionally, the Office Action acknowledges that the cited references are each silent as to the limitations of claims 3-9 and 26-31, but dismisses these limitations as optimization. This is not appropriate. As discussed in the above-captioned application, the use of a heat spreader formed of sheets of compressed particles of exfoliated graphite for a plasma display panel presents unique challenges in the high volume manufacturing processes needed for commercial efficacy. The claimed limitations are those which are significant for such commercial efficacy. Since, as tacitly acknowledged in the Action, the use of sheets of compressed particles of exfoliated graphite as plasma display panel heat spreaders is new, the properties needed for high volume manufacture of plasma display panels having such heat spreaders cannot be routine, and the determination of what the specific limitations should be is inventive.

Furthermore, nothing in Brookes, which is wholly inapposite to the claimed invention of the above-captioned application provides any missing suggestion of obviousness.

Consequently, the rejection of claims 1-9, 12, 24-31 and 34 under 35 U.S.C. §103 is misplaced, and the rejections made herein should be withdrawn.

CONCLUSION

Based on the foregoing amendments and remarks, it is believed that allowance of all pending claims 1-9, 12, 24-31 and 34 is appropriate. Such action is earnestly sought. If there remains any matter which prevents the allowance of any of these claims, the Examiner is requested to call the undersigned collect at 615.242.2400 to arrange for an interview which may expedite prosecution.

The Commissioner is authorized to charge any deficiency, or credit any overpayment, attendant to this application or the filing of this response, to Deposit Account No. 50-1202.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMITTAL

I hereby certify that this Response To Office Action, including Certificate of Facsimile Transmittal are being facsimile transmitted to the United States Patent and Trademark Office, Fax No. 703.872.9306 on March 4, 2005.

James R. Cartiglia

Signature
Registration Number 30,738